

THE NEW FOREST ON LOGGED-OVER LANDS...

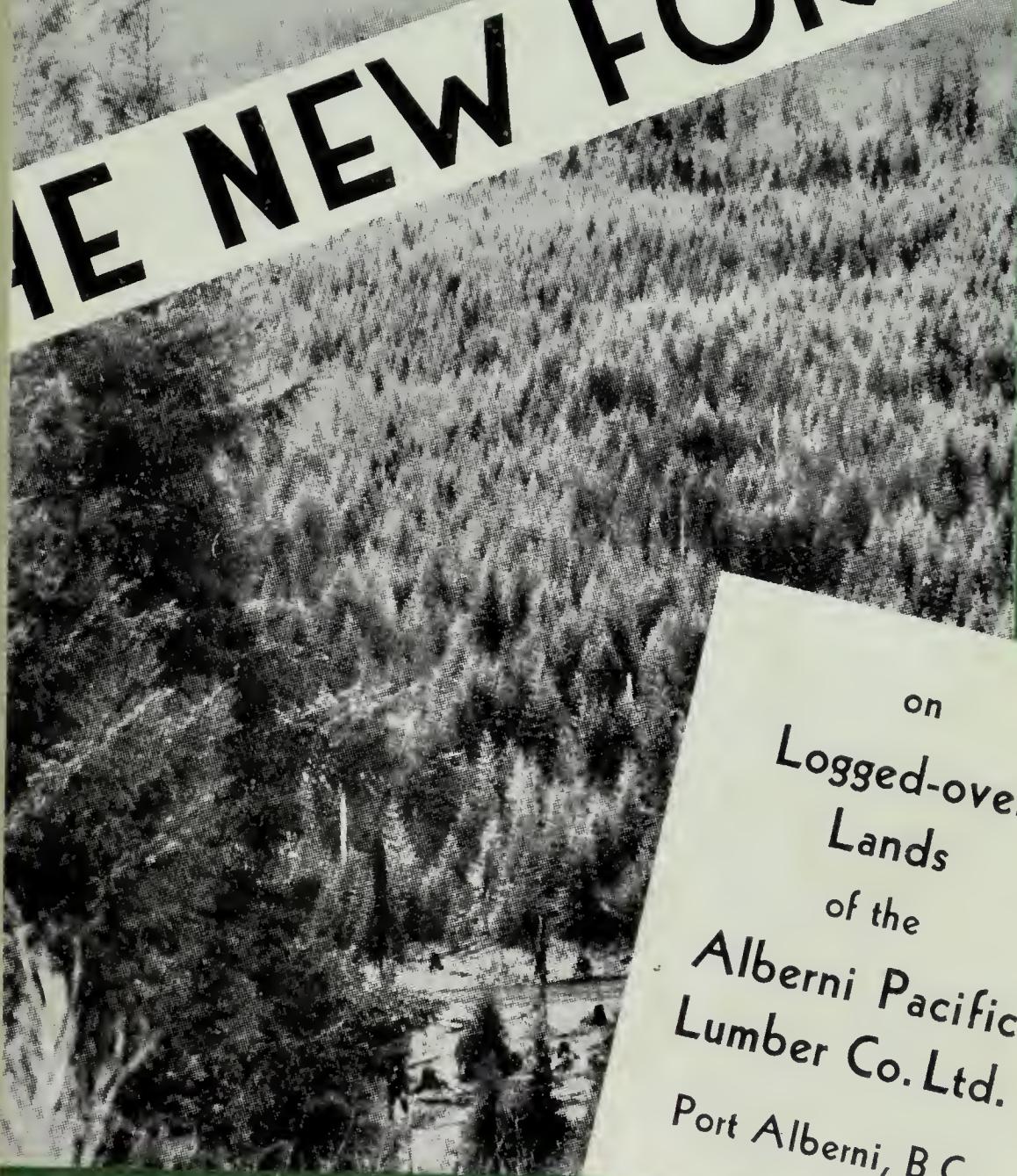
MacMillan

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THE NEW FOREST



on
Logged-over
Lands
of the
Alberni Pacific
Lumber Co. Ltd.
Port Alberni, B.C.

by H. MacMillan

C.B.E., B.S.A., M.S.F.

*These brief remarks on forest
policy are dedicated to the
generation that will harvest the
New Forest crop some 40 to
80 years hence . . . if sound
forestry practices are pursued.*

THE NEW FOREST



T

HE TIMBER holdings and logged-over lands of the Alberni Pacific Lumber Company Limited, together with some adjoining lands in the same watershed and including the Company's lands and adjoining lands on upper Cameron River, Rogers Creek, and upper China Creek, might constitute a natural forest working circle† of about 175 square miles opened up chiefly by the Company's road systems, on which, foresters estimate, could be grown in perpetuity an annual forest crop of about 60 million feet board measure* which would be insurance for the continuous support of the population of the city and district. Under improving forest management, the annual volume and value of the forest crop could considerably increase.

Historically the forest valley tributary to Alberni has stirred more than one imagination. Here in 1860 Captain Stamp built the first steam-driven and the first export sawmill in Western Canada. Here in 1890 pioneers from

† 'Forest working circle' is a term used by the Provincial Forest Service to denote a forest area managed as a unit to produce a crop every year in perpetuity thus achieving permanent employment.

* As a result of extensive growth studies on second-growth Douglas fir in Washington and Oregon, government foresters in those States estimate that the crop of Douglas fir on fully stocked land in their forests will be as follows in board feet per acre:

The calculations are made according to the International Scaling rule which being based upon $\frac{1}{8}$ -inch saw kerf and closer utilization down to 16' logs and 5" tops, is nearer the truth for future conditions than the B.C. log rule.

AGE YEARS	BEST SITES	MEDIUM SITES	FAIR SITES
60	73,000	55,000	27,000
80	109,000	90,000	57,000
100	133,000	114,000	77,000
120	149,000	130,000	92,000

Probably only 5% of the Douglas fir region in B.C. would qualify for the best site, and 50% for the combined best and medium sites.

At 60 to 120 years the trees will vary from 100 to 200 feet high. When the forest is 100 years old the trees will be 18" to 30" diameter. After 120 years the annual increment of wood per acre declines rapidly.

Scotland established the first paper mill on the western shores of this continent. Here are now two of the greatest logging and saw milling operations in Canada.

Geography, topography, soil and climate combine to make this area a first-class forest site. The average distance of the timber from railroad and deep-sea shipping facilities is within 25 miles. The elevation of commercial forest varies from sea level to 3,000 feet. Swamp area is negligible. The topography is excellent for railroad or truck construction or operation. There is relatively little rock exposure within the commercial forest. The soil is glacial clay, with a little gravel, unfit for agriculture except in patches but eminently suitable for growing timber. The constant employment and the regular market provided by a perpetual forest crop will encourage farm use of all existing arable patches, many of which otherwise are unlikely to be developed permanently. Some land cleared for agriculture 50 years ago has reverted to forest. The average annual precipitation of 67 inches favours natural regeneration and tree growth. Except in the higher levels, operations in the district are seldom impeded by snow.

Two main age classes in the forest in this valley adjoin but do not overlap. These age classes represent crops following ancient fires. The old growth forest 450 to 700 years old is about 75% Douglas fir, produces 35,000 to 100,000 feet per acre. The younger forest, over two-thirds Douglas fir, which covers the most of the area is 200 to 300 years old, and produces 15,000 to 60,000 feet per acre. The old growth trees have practically ceased growing. Even the younger class of forest is growing very slowly. A tree 280 years old had reached 20 inches stump diameter at 100 years, but in the last 100 years increased its diameter by only 7 inches. Another tree measured inside the bark at stump height was 19" diameter at 50 years, 26" diameter at 100 years.

The operations of the present Alberni Pacific Lumber Co. Ltd. are almost wholly based upon titles acquired from predecessors in 1936. These titles represent lands which passed out of the possession of the Province of British

Columbia on December 19, 1883, under conditions of freedom of use in effect at that time. Some of these titles passed through several hands before reaching the present owners. In each case the purchase price was based upon and enhanced by the conditions of the title, notably freedom from royalty and freedom to export logs. A considerable volume of timber has grown on the lands during the 61 years elapsed since the land was alienated by the Province of British Columbia.

The Alberni Pacific Lumber Co. Ltd., from the inception of its development in the Ash River valley in 1937, has studied the conduct of its operations to achieve the greatest degree of fire protection and of natural reproduction. The forest is almost everywhere even age and even height. For reasons of mechanics, economy, silviculture, and fire protection, it has not yet been found practicable to practise over any important area on this property any system of selective logging, i.e., removing some trees from each acre and leaving others to grow larger or to stand over until another rotation, meanwhile furnishing seed to produce the next crop in the surrounding blanks*. Also the understory in this forest consists chiefly of suppressed hemlock, which if released by selective removal of the Douglas fir would not make the next best crop that can be produced.

On the other hand, clear cutting continuously over large areas on an ever-advancing front, with the methods that are necessarily adopted to handle the very large logs, leaves not enough seed trees for sufficient years near enough to the cut-over land to provide adequately for the next crop.

Therefore almost at the start the Alberni Pacific Lumber Co. Ltd., after discussion with the Provincial Forest Service, adopted the patch system of logging to provide reforestation. An important problem to solve was the erratic seeding habit of Douglas fir which produces about three seed crops in ten years at intervals up to four years.

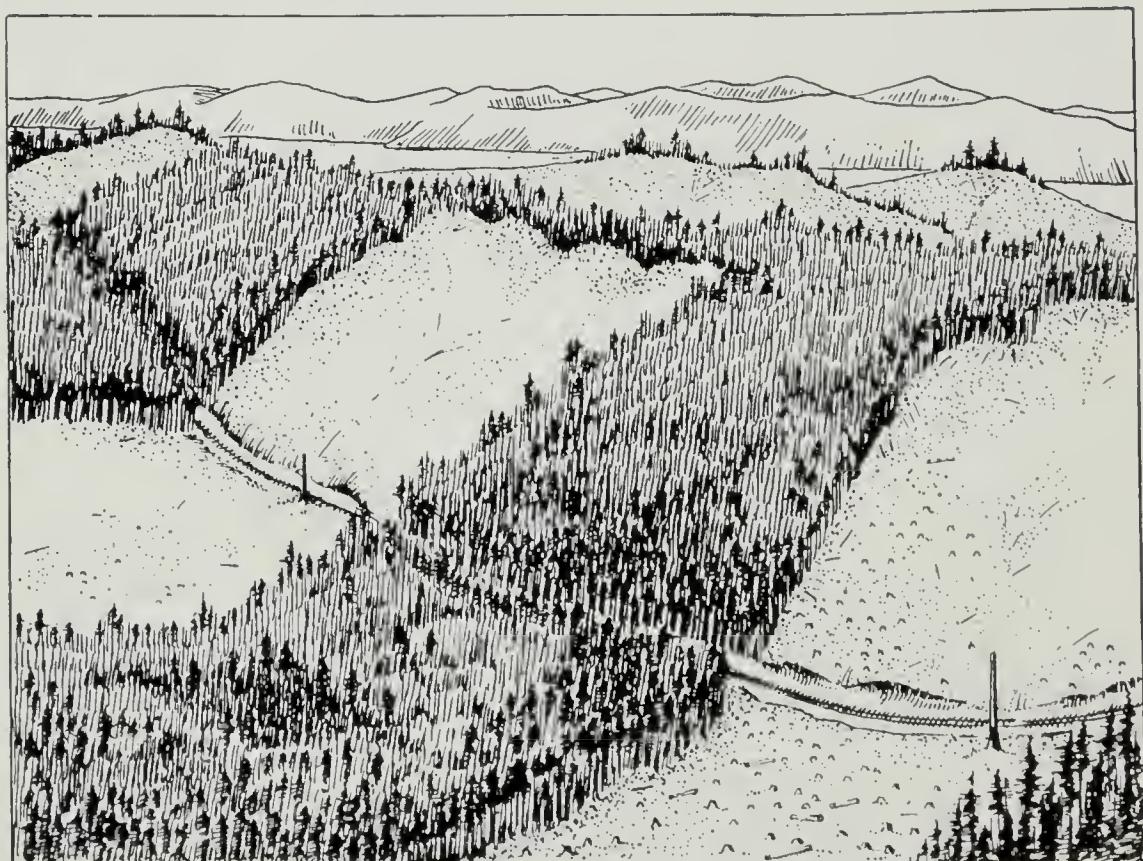
* Douglas fir requires sunlight, therefore seedlings will not appear and grow except in considerable openings in the forest.

The principles of the patch logging system are:

(1) The forest is logged in a succession of small areas, according to the topography, of approximately 130 to 300 acres, surrounded usually for 3 to 5 years by green timber frequently on 3 or 4 sides but at least on 2 sides.

(2) In addition, every advantage is taken to leave seed trees where they will escape knock down, blow down, or fire, such as defective or less valuable individuals or groups between settings, on streams or on ridges.

(3) The slash is burned particularly carefully under weather conditions unfavourable to consuming of soil and under control against destruction of adjoining forest or seed trees.



Clear cut patches practically surrounded for several years by virgin forest from which seeds spread.

Extensive studies in Washington and Oregon indicate that on many or most sites natural reproduction is more numerous and survives better if slash is not burned. The reason for burning slash is not to improve forest repro-

duction but to remove a fire hazard in limited areas under control before seedlings start as a means of escaping a later large uncontrolled conflagration destroying seed trees and seedlings, and in some cases other property, which has apparently been the cause of lack of reproduction on some extensive logged-over areas in British Columbia.

Nevertheless, undoubtedly certain sites will be logged where slash burning is unnecessary or inadvisable and should therefore not be permitted.

The Forest Service will inherit the responsibility of these decisions and should be strengthened for the purpose. Blanket slash burning regulations throughout the Coast district will not be the best management for all sites.

Some disadvantages arise from the patch system:

(1) The investment in roads and equipment is greater than in clear cutting. Over 80 miles of railroad are kept in continuous operating condition to maintain the Alberni Pacific logging operations. On this particular operation about $2\frac{1}{2}$ miles of railroad are constructed for every square mile logged. Obviously scattering the logging operations on the patch system increases the mileage of logging railroad kept in service.

(2) More careful planning farther ahead is necessary.

(3) It is necessary to create some fire guards to protect seedlings from fire when neighbouring patches are burned.

(4) The cost per thousand feet of logs produced may be a little greater.

The advantages of the patch system are:

(1) The burning of slash in small areas keeps fire more easily under control thus reducing risk of fire damage to timber, logging equipment, and to young forest.

(2) Greatly improved natural reproduction from the large numbers of seed trees standing for some years

within seeding reach of practically the whole area of the logged patch.

(3) Larger area of forest opened up facilitates producing species and grades of logs according to market requirements.

(4) Small areas logged at one time on each hillside or stream prevents erosion and protects fishing streams.

(5) Areas of green timber between cuttings and small areas burned at one time provide shelter and food for game birds and animals.

(6) Small areas of slash burned at one time reduces soil destruction common in very large fires and is insurance against fires escaping control.

The Alberni Pacific Lumber Co. Ltd. since 1937 has logged by the patch system about 12,000 acres in the Ash River valley. Owing to time required to open up enough miles of railroad in the first years the patches were possibly too large. Shortage of help during the war has prevented the Forest Service from maintaining annual reproduction studies on the 1,200 sample plots which they established to study progress of natural seeding. This field study will be completed early this season. Meantime on many areas reproduction appears perfect. Many patches logged in 1938 are still reseeding from adjoining seed trees. It appears safe to estimate that two-thirds of the whole logged area has already reproduced sufficiently. Planting has already begun on known bare patches and will be continued as labor and seedlings are available.

When this summer's field study is completed we shall have such information as:

- (1) How many years are required to reseed patches.
- (2) How far logged land will reseed from adjoining forest or scattered trees.
- (3) Influence of prevailing winds on seed distribution.

(4) To what extent the species of the original forest are reseeding.

(5) What proportion of logged-over land must be reforested by planting to achieve economical crop.

(6) To what extent slash burning practises on this operation should be modified.

In order that there may be better public understanding of the problems of reforestation and that there may be better assimilation of the facts concerning conditions on the logged lands of the Alberni Pacific Lumber Co. Ltd. and adjoining forest lands to which these remarks apply, signs have been erected at representative points on the highways and logging railroad.



Protection from any fire after the first slash burn has permitted seed trees to survive, the heavier logging debris to decay for 15 to 32 years, and seedlings to grow to heights of 5 to 25 feet.

A description follows of the conditions to which the signs call attention:

SIGN No. 1

LOON LAKE: Logging began here by railroad contractors about 1912 and was completed by the Alberni Pacific Lumber Co. Ltd. about 1929. Though it is believed that much of the area was burned twice, seed trees survived

individually and in clumps. A new Douglas fir forest 10 to 25 years old has been established on about 90% of the area of about 27 square miles covered by the logging operations on which are erected signs No. 1 and No. 2 at observation points on the Island Highway.



The young Douglas firs, which nature has provided for a new forest, are growing 1 to 2 feet in height yearly.

SIGN No. 2

ALBERNI WATERSHED: This area of heavy Douglas fir forest was logged by Alberni Pacific Lumber Co. Ltd. 1912 to 1929 and subsequently erratically burned. Scattered groups of trees provided reseeding which as seen from numerous roads entering the property has achieved thorough restocking chiefly by Douglas fir. The easy logging ground, existence of road system, short distance from town, promise high value at early age for this forest which now is 10 to 25 years old. This 27 square miles of young forest will in another 60 years contain at least 600 million feet of timber.

There is visible from Sign No. 2 over 150 square miles of productive forestland, almost all young constantly growing trees, which henceforth require only fire protection to enable them to yield a large and valuable crop.

Whatever may be the means adopted this area should hereafter be managed for forest crop.



This dense forest of Douglas fir followed naturally after a fire about 45 years ago. Most of the crowded trees are now 4 to 5 inches in diameter, 31 to 45 feet high. Interspersed amongst these, several to the acre, are the dominant individuals which will form the next crop which are 41 years old, 16 inches in diameter and 74 feet high.

SIGN No. 3

BAINBRIDGE AREA: This tract of 14 square miles logged 1915 to 1928 and erratically burned, together with about 2 square miles cleared for agriculture 1890 to 1900 but reverted to forest, is almost completely reforested with age classes 10 to over 40 years.

A great many scattered trees were left on this particular logging operation, which, in the particularly favourable seeding and growing conditions of this valley, insured excellent restocking.

Fields labouriously cleared for agriculture are now completely covered with young Douglas fir 5 to 30 feet high, showing the determination and ability of this species to seize and hold the soil in this district.

This area has been subdivided and is in many different ownerships. The owner of a hundred or a few hundred acres of forest land is not likely to pay taxes to retain ownership waiting for an 80-year crop rotation. Some tracts have reverted to the Crown and others may be expected to follow.* Such Crown lands might well form the nucleus of an Alberni provincial forest.



The valley of the Ash and Stamp Rivers, 5 to 7 miles across, several miles long in each direction, is covered with fast-growing 10 to 40-year-old Douglas fir.

More than 150 square miles of the valley is visible from this point, almost all of the logged portions of which are restocking from the scattered seed trees. Note the young conifers growing under the alders and maples.

From Signs No. 2 and No. 3 (on the logging railroad) there is visible one of the most valuable and accessible forest working circles that could possibly be established in British Columbia.

* Almost 30% of this area is now owned by the Crown.



The seed trees and the new crop. Time and fire protection only are needed to mature this into a very valuable forest. The young trees are 37 to 41 years old, 9 to 12 inches in diameter, 64 to 70 feet high.

SIGN No. 4

BURNED IN 1900: The fire which destroyed over 10 square miles of high-quality, old-growth fir forest left numerous trees, many still standing, which have fully reseeded the whole burned area. This 10 square miles of young forest, now 20 to 40 years old,* growing rapidly, on perfect logging ground within a few miles of Alberni on a good road system, will produce within the life of persons now living 250 million board measure of logs for the future employment of children now here.

SIGN No. 5

130-ACRE PATCH LOGGING: The original forest of old-growth fir 450 years old was logged in 1938 and the slash burned in 1938. The adjoining forest was near enough to provide plentiful seeding. Observe that some young hemlocks a few feet high have escaped the fire, some

* Douglas fir produces seed when 20 to 25 years old.

seedlings are several inches high but many are only one or two inches high and are hidden by other vegetation. On



The passerby would see nothing but slash and imagine nothing but destruction. On three widely separated 1/10-acre patches chosen at random, seedlings were counted at the rates of 1060, 1300 and 1730 per acre, which is more complete stocking than if planted by the Government. The forest on the edges of the logged patch furnished the seed.

a 1/10th acre plot where few seedlings were visible a careful count discovered 144.

The British Columbia Forest Service does not regard logged-over lands of the Douglas fir region as fully stocked unless there are 1,000 seedlings per acre. The United States Forest Service, which has had ample staff to make exhaustive studies on forest areas in Washington and Oregon, similar to our conditions, rate land as fully stocked if there is 1 seedling in each area 13.2 feet square, which is 1/250th of an acre. The adoption of this standard would classify as satisfactorily restocked some logged-over lands which are at present classified as unsatisfactory by the British Columbia Forest Service.



The Douglas fir planted in 1941, 6 feet apart each way, are now about one foot high. On this site they may produce 60,000 to 100,000 feet per acre when 80 years old, measured according to the standards of utilization to be expected at that time.

SIGN No. 6

1941 DOUGLAS FIR PLANTATION: Logged 1938, burned 1938. When logging was started in the Ash River valley the difficulty of building sufficient railroad ahead

of active logging caused the clearing of larger patches than could be reseeded from patch boundaries, consequently some planting will be necessary on larger patches. This patch reseeded sufficiently as far as about 200 yards from the adjoining forest but at a greater distance planting was necessary for early restocking. Other such areas will be planted.

The trees provided free by the Provincial Forest Service were planted by the Company at a cost of less than \$10.00 per acre. Very few have died.

SIGN No. 7

160-ACRE PATCH REFORESTED: Logged 1938, burned 1938. Due to a combination of nearby seed trees and good seed years, a fully stocked one to four years old crop has already appeared. Note that careful slash burning has protected marginal timber.



The controlled light pre-cropping burn has destroyed the small readily inflammable slash, has injured the soil little if any, but has left larger pieces of debris almost unaffected. There are over 1,000 young trees per acre, almost all Douglas fir, from one side of the patch to the other, a distance of between 300 and 400 yards.

In conclusion please note:

(1) Achieving forest reproduction by adapting logging methods is not yet an exact science, nevertheless much has been learned and many thousands of acres restocked on this operation by this system.

(2) The reseeding of the next crop has been a problem of great concern to the officials of this Company, who have taken great care to plan their operations to encourage reseeding and have incurred many expenditures to that end.



The young trees are slow growing and inconspicuous amongst other vegetation in their first three or four years, while establishing their root system. During the several years the seed trees remain beside the logged patch, additional young trees appear yearly.

(3) The dense growth of young seedlings along the railroad right-of-way indicates the seed crop available if, without too much expense, we can create suitable seeding and germinating conditions.

(4) You have seen only a little of the reproduction on the logged-over lands and adjoining lands in the area in which the Alberni Pacific Lumber Co. Ltd. (and predecessors) have been active for 32 years. A longer exam-

ination would disclose that with relatively remediable exceptions requiring planting, the whole logged area of about 70 square miles has reproduced bountifully. A valuable future crop growing at the rate of more than 20 million board feet annually depends henceforth only on fire protection.

(5) If one may compare actual conditions in this district with published statements respecting other districts, natural reproduction in this district is much better than the average elsewhere. If so the cause probably lies in the climate, the soil, the methods of logging practised, and the fortunate freedom from forest fires after seedlings have started.



The wall of virgin Douglas fir forest of equal age, equal state of maturity, which because of the great size of the logs and fire danger precludes economic selective logging. The taller trees in the lower ground in the centre reflect favourable soil and moisture conditions. The foreground shows slash immediately after logging and before burning. The timber on the ground is chiefly dead tops, snags, broken pieces. This will decay and enrich the soil. It constitutes the "green manure" of forest cropping.

(6) The patch system has been proved here as possible on a railroad operation. This method can be much more easily worked out on a truck logging operation.

(7) It is unfair for the urban-dwelling public to accuse the workers in the woods of apathy respecting future forests. Those whose livelihood it is to open up and make useful and valuable the forest areas of this country are, of all our population, the most keenly conscious section respecting the next forest crop and in my opinion are willing to follow the lead of the Provincial Forest Service in adopting forest management methods by which we can achieve the two important objectives of employing our present working population dependent on forest industry and provide for the next crop.

(8) No one seems to be very sure what volume of crop we may expect and at what age it will be reaped. There is much to learn yet on these points.

Growth studies by the United States Forest Service, quoted at foot of page 5, indicate that growth estimates herein are modest.

Chief comfort lies in the vast number of acres we have available for producing forest and the rapid growth of important forest species in this coast climate.

The British Columbia Forest Service during its 32 years of life has been depleted by two world wars, has been loaded with revenue collection, fire protection and other administrative duties, and has been starved for money. Consequently insufficient trained men have been available for the study of existing forests and of reproductive and growing habits of our trees on different sites without which knowledge we are forced to guess at the extent and character of our forest resources under varying conditions in our different forest areas.

Fortunately our guesses can be guided by reference to many exhaustive studies made during the past 20 years by the highly developed Forest Services in Washington and Oregon. These are helpful but not dependable in our climate and latitude.

If the British Columbia public is serious about a permanent forest in British Columbia the guess must be taken out of the business by employing larger numbers of trained men and allowing sufficient selected men free time for study.

There are many times more scientifically trained men studying and advising respecting apples, small fruits, poultry, and seeds in British Columbia than there are trained foresters studying and advising respecting forests; nevertheless, the forest is by far the most important crop to the public, both now and for the long pull.

In correcting this weakness, neither the Forest School of the University of British Columbia, nor the various governments of the last 30 years have seen and met their obligations.

The situation is in no way the fault of the loggers and the lumbermen whose function is only economic, technical and managerial, to reap the crop and prepare it for use by consumers here and elsewhere.

The business of logging has not been hidden. It has been conducted conspicuously before the public gaze for over 50 years.

If anyone is to be blamed it is the public, who have not been interested, other than to use forest revenue from royalties, stumpage from timber sales, rentals, income taxes and succession duties arising from forest profits, for public works, social services, and other purposes and to do so have starved the public services who could have advised and administered a wiser protection and management of forests.

(9) Those whose ideas respecting reforestation depend upon what is visible from an automobile are likely to be both misinformed and pessimistic. The young trees do not rise above the vegetation for several years. Before forming an opinion one should count carefully the number

Fareward

Thirty-two years ago I came to British Columbia as the first Chief Forester. Since then about 61 billion feet of logs have been removed from the British Columbia forest area West of the Coast mountains and south of Queen Charlotte Sound. Prior to 1912 about 12 billion feet had been cut from this area. The removal of this crop of 73 billion feet of logs, over 50% Douglas fir, has created 2½ to 3 million acres of logged-over land only about 3% of which, under present economic conditions, is suitable for higher use than growing timber.

The Coast forest district above-described produces about 94% of the Douglas fir products in Canada, 83% of the lumber output of British Columbia, about 37% of the lumber output of Canada. It also supports a large shingle, plywood, pile and pole industry, supplies immense quantities of domestic and industrial fuel, and produces the pulpwood for several very important pulp and paper plants.

Higher prices, improving methods of logging, notably mastery of truck logging, full use of small logs instead of leaving them on the ground, and closer utilization of logs of all sizes, qualities and species, necessitate upward revisions of published volume estimates of commercial timber still remaining in the Coast forest district. Until new official estimates are published it seems safe to indicate that about 80 billion feet of commercial timber now remains in this district, of which about 27% is Douglas fir. This estimate is more likely to prove low than high. Forests now inaccessible will become accessible as areas now within reach are logged and roads are extended. About 80% of this remaining timber is on Vancouver Island. The proportion of Douglas fir is higher on Vancouver Island than on the mainland.

The Coast forest district of Washington and Oregon now contains over six times as much commercial timber and twelve times as much Douglas fir as the Coast forest district of British Columbia. The rate of depletion is proportionately slower in Washington and Oregon than in British Columbia but the study and expenditure on forest protection and forest management is proportionately considerably greater.

Douglas fir is the most valuable and quickest-growing crop for the Coast logged-over land. Therefore, economic measures to reproduce Douglas fir are most important for the life of British Columbia.

There appears still time to put forest industries on a permanent basis in this district. The greatest need is more knowledge, and natural seed-ing, combined with planting and continuously effective fire protection.



June

1944.

H.R. MacMillan

C.B.E., B.S.A., M.S.F.

1920-1921

1921-1922

1922

1923

1924

1925

1926

1927

1928

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**KEY MAP OF
ALBERNI-PACIFIC LUMBER CO. LTD. TRACTS**

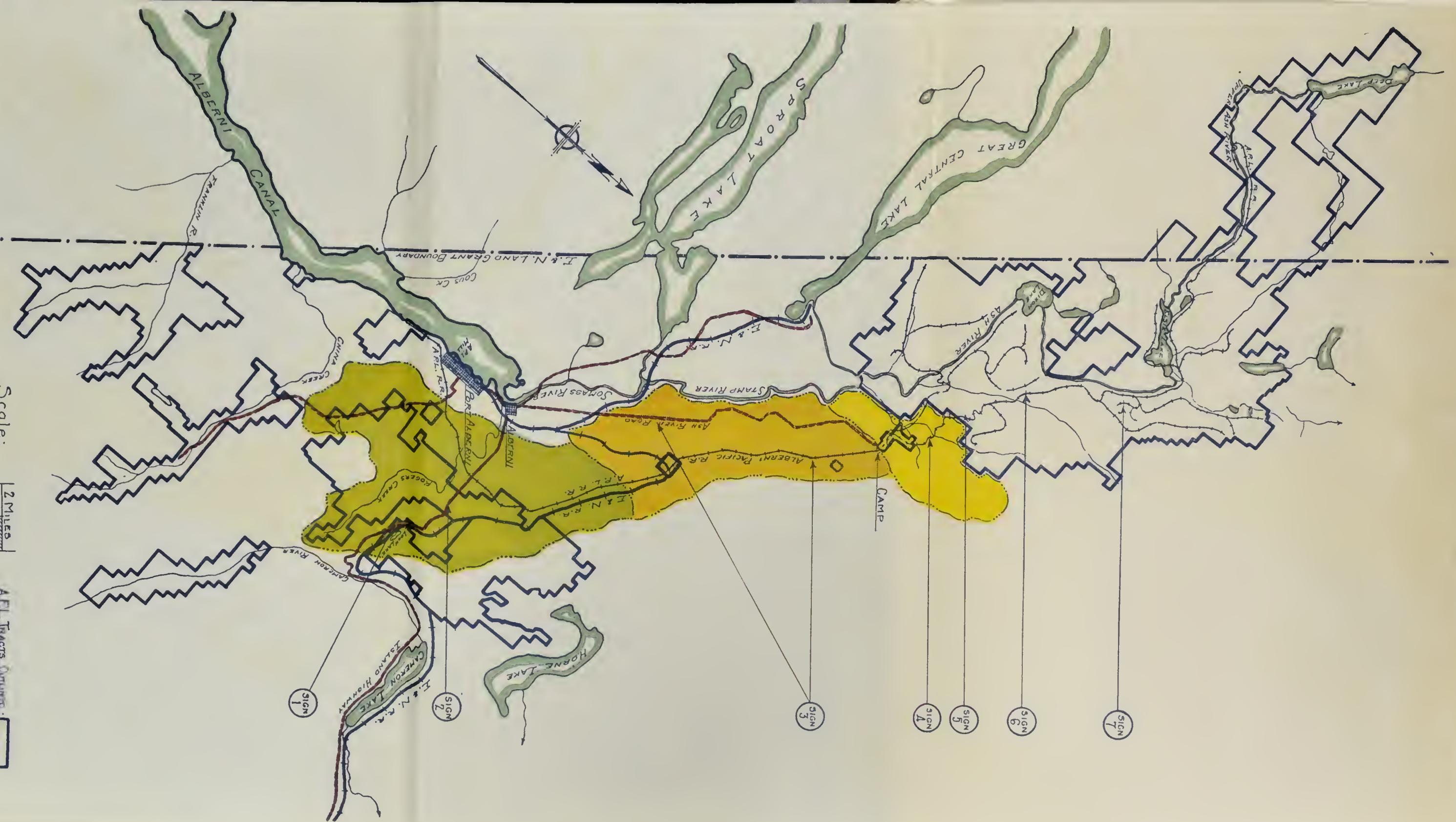
VANCOUVER ISLAND B.C.

Scale:

2 Miles

ALBL Tracts outlined:

LEGEND:
AREA 27 Sq. Miles (Sign 1&2)
AREA 14 Sq. Miles (Sign 3)
AREA 10 Sq. Miles (Sign 4)



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